

REMARKS

After the foregoing amendments, claims 1-4, 6, 7, 9-16, 18 and 19 are pending in this application. Claims 1-3 have been amended. Claims 5, 8 and 17 have been canceled. No new matter has been added by these amendments.

Objections to the Specification

The Action objected to the specification because it contains numerous typographical errors. Applicant has amended the specification. The changes are included in the marked-up and clean versions of the substitute specification submitted with this Reply.

Rejection Under 35 U.S.C. §112, second paragraph

Claims 4, 11, 12, 13, 18 and 19 are rejected under 35 USC § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter that applicant regards as the invention. According to the Action, the character “~” renders the claims indefinite. In addition, claim 4 contains a percentage range limitation but does not recite the basis for this percentage.

Applicant has amended claims 4, 11, 12, 13, 18 and 19 and eliminated the “~” character and has amended claim 4 to clarify the basis for the percentage. Applicant respectfully requests withdrawal of the 35 USC § 112, second paragraph rejection.

Rejection Under 35 U.S.C. §103

There are two independent claims; 1 and 14. Both are amended. Claim 1 now contains the subject matter of claims 5 and 8. Claim 14 now contains the subject matter of claims 5 and 17. Claims 5, 8 and 17 have been canceled.

Independent claim 1 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Akhtar (U.S. Pat. No. 6,402,887). According to the Action, Akhtar teaches every limitation of claim 1 except boiling the pulp solution. But Akhtar discloses steaming the pulp solution and that the pulp solution may be pulped using a kraft process operated at 171°C. Therefore, the step of boiling the pulp would have been obvious to one of skill in the art at the time of the invention.

Independent claim 14 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Akhtar as applied to claim 1 in view of Sweeney (U.S. Pat. No. 1,639,152). According to the Action, Akhtar also does not disclose that the method is used for a non-woody fiber plant but Sweeney discloses using a non-woody fiber plant and that it would have been obvious to one of ordinary skill in the art to combine the teachings of these patents.

Claims 5 and 8, now incorporated into claim 1, stand rejected under 35 USC § 103(a) as being unpatentable over Akhtar as applied to claim 1 (provided above) in view of Schulein et al (U.S. Pat. 6,387,690). According to the Action, Akhtar does not disclose that the microorganism is a bacterium or that it is isolated from a non-

wood plant or excrement compost. But Schulein discloses that the microorganism is isolated from a non-woody fiber plant and that the microorganism is a Gram positive bacterium selected from a group consisting of a *Bacillus licheniformis*, a *Bacillus subtilis* and a *Bacillus amyloliquefaciens* and that it would have been obvious to one of ordinary skill in the art to combine the teachings of these patents.

Claim 17, which is incorporated into amended claim 14 along with claim 5, stands rejected under 35 USC 103(a) as being unpatentable over Akhtar and Sweeney as applied to claim 14 further in view of Schulein. According to the Action, Akhtar and Sweeney disclose all of the elements of claim 14 except that the microorganism is selected from the claimed group. But Schulein discloses that the microorganism is selected from a group consisting of *Bacillus licheniformis*, a *Bacillus subtilis* and a *Bacillus amyloliquefaciens* and that it would have been obvious to one of ordinary skill in the art to combine the teachings of these patents.

Applicant respectfully disagrees with the above rejections for the following reasons.

Rejection of Claims 1, 5 and 8

To establish a *prima facie* case of obviousness under 35 USC § 103(a) the prior art reference, or references when combined, must teach or suggest all of the claim limitations. MPEP § 706.02(j). With respect to the rejection of claims 1, 5 and 8, Schulein does not disclose that the microorganism is isolated from a non-

woody fiber plant as in amended claim 1. This feature is not found, especially in Column 24, Line 20 to Column 28, Line 62 as stated in the Action. These portions of Schulein simply list organisms. Because Schulein and Akhtar do not disclose all of the claim limitations, they do not render amended claim 1 obvious. Withdrawal of the 35 USC § 103(a) rejection of claims 1, 5 and 8 is respectfully requested.

Rejection of Claims 1, 5, 8, 14 and 17

Applicant respectfully submits that claims 1, 5, 8, 14 and 17 are not obvious in view of Akhtar and Schulein for the reasons set forth below.

First, Akhtar and Schulein are not analogous art because they are not in the same field of endeavor and the invention of Schulein is not reasonably pertinent to the particular problem with which the inventor was concerned. MPEP 2141.01(a). Schulein's invention relates to enzyme preparations where the microorganisms are used for cloning the endoglucanase. See e.g. U.S. Pat. No. 6,387,690, col. 11, lines 13-24). Akhtar's invention relates to processes in the production of pulp from industrial wood waste. See e.g., U.S. Pat. No. 6,402,887, col. 4, lines 46-50. Because Schulein and Akhtar are not analogous art, together, they cannot render the present invention obvious. MPEP 2141.01(a). There is no suggestion in either Schulein or Akhtar to combine their respective teachings as required for a finding of obviousness.

Second, Schulein is not analogous art with respect to the present invention.

As provided above, Schulein's invention relates to enzyme preparations where the microorganisms are used for cloning the endoglucanase but the invention of the present application relates to paperpulp preparation where the microorganisms are used to decompose the plant body. Therefore, Schulein, in light of Akhtar cannot render the present invention obvious.

Third, Akhtar discloses a biomechanical or kraft pulping process. In Akhtar's process the wood chips that are used for producing the paper pulp are heat treated to reduce the population of naturally occurring microorganisms and then the wood is inoculated with white-rot fungus. But in the present invention, the fungus used is a microorganism selected from a group consisting of a *Bacillus licheniformis* (PMBP-m5), a *Bacillus subtilis* (PMBP-m6) and a *Bacillus amyloliquefaciens* (PMBP-m7), which are isolated from one of a fiber plant and a livestock excrement compost.

Fourth, Schulein does not disclose that the microorganism is selected from a group consisting of a *Bacillus licheniformis* (PMBP-m5), a *Bacillus subtilis* (PMBP-m6) and a *Bacillus amyloliquefaciens* (PMBP-m7), which are isolated from one of a fiber plant and a livestock excrement compost, as claimed in amended claims 1 and 14.

Finally, the present invention provides many advantages over Akhtar and Schulein. As described in the specification of the present application, the white-rot

fungi used in Akhtar for removing the lignin of woods is sensitive to biological process operations and must be inoculated, which takes time and incurs extra costs. In addition, white-rot fungus does not grow well in suspended cell systems. Furthermore, as disclosed in Akhtar's patent, the wood chips must be heat treated to reduce the population of naturally occurring microorganisms that inhibit growths of the white-rot fungi either directly or competitively. Multiple, costly heat treatments are required in Akhtar's patent.

The microorganisms, claimed in amended claims 1 and 14; namely, *Bacillus licheniformis* (PMBP-m5), *Bacillus subtilis* (PMBP-m6) and *Bacillus amyloliquefaciens* (PMBP-m7), having the decomposition ability for fiber plants, are isolated from fiber plant or livestock excrement compost, belong to *Bacillus* species, which are not harmful to the environment and will not damage the human body.

The white-rot fungus in Akhtar's patent is a pathogenic species, which will damage the environment, such as causing diseases to woods or fruits. These three *Bacillus* strains of the present application could be easily applied in biological process operations and in the natural environment and could be inoculated on the plant without any extra heat treatment. In other words, there is no adverse effect between the *Bacillus* strains and the natural microorganisms while the *Bacillus* strains are applied on the plant material so that the decomposition effects will not be affected and the cost for producing the paper pulp is reduced.

Moreover, the decomposition abilities of the three *Bacillus* strains, claimed in amended claims 1 and 14, on the plant material are more efficient, safer and more cost-effective, than that of the heat treatment or other comparative species. Paragraphs 39-42 of the present application provide comparative data which are summarized in Fig. 1.

Finally, none of the cited references disclose the use of the *Bacillus* stains, *Bacillus licheniformis* (PMBP-m5), *Bacillus subtilis* (PMBP-m6) and *Bacillus amyloliquefaciens* (PMBP-m7), and the better decomposition properties thereof.

Based on the foregoing, Applicant respectfully submits that amended independent claims 1 and 14 are patentable over the cited art. Claims 2-4, 6, 7, 9-13, 15, 16 18 and 19 depend from claims 1 and 14 and therefore, are also allowable. Applicant respectfully requests withdrawal of the 35 USC § 103(a) rejection of claims 1-4, 6, 7, 9-16, 18 and 19.

Double Patenting

The Action advised that claim 18 will be objected to under 37 CFR 1.75 if it issues because it is a substantial duplicate of claim 12.

Applicant has amended claim 18 to depend from claim 12. Therefore, claim 18 is no longer a duplicate of claim 12. Applicant respectfully requests withdrawal of the double patenting rejection of claim 18.

Claims 1-3, 6, 8, 9, 11-16, 18 and 19 stand provisionally rejected on the

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ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 2-10, 15 and 16 of Application No. 10/783,912.

A Terminal Disclaimer is submitted herewith to overcome the nonstatutory obviousness-type double patenting rejection of claims 1-3, 6, 8, 9, 11-16, 18 and 19. The withdrawal of the nonstatutory obviousness-type double patenting rejection of these claims is respectfully requested.

Conclusion

If the Examiner believes that any additional minor formal matters need to be addressed in order to place this application in condition for allowance, or that a telephone interview will help to materially advance the prosecution of this application, the Examiner is invited to contact the undersigned by telephone at the Examiner's convenience.

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The Applicant respectfully submits that none of the references cited in the Action render claims 1-4, 6, 7, 9-16, 18 and 19 obvious. The present invention is patentable over the cited references, and reconsideration and allowance of the present application is requested.

Respectfully submitted,

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